# 2132*i* and 2116*i*

## Temperature and Process Indicator and Alarm Units

**Installing and Operating Instructions**

Thank you for choosing the 2132*i* or 2116*i* indicator and alarm unit. It will provide accurate measurement and display of temperature and other process variables with up to two alarm outputs for operator alert and process protection.

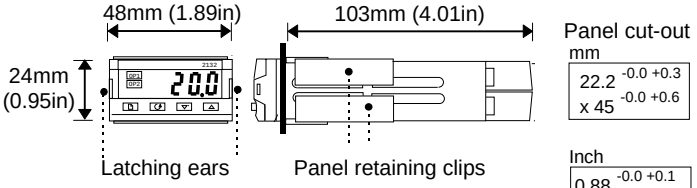
Models **2132*i*/AL** and **2116*i*/AL** are *Indicating alarm units* which come with an alarm relay output and logic I/O fitted.

Models **2132*i*/ND** and **2116*i*/ND** are *Indicator only units* which come without the alarm relay output or logic I/O fitted. Alarms can still be configured and flashed as messages in the main display but they will not be able to operate a physical output.

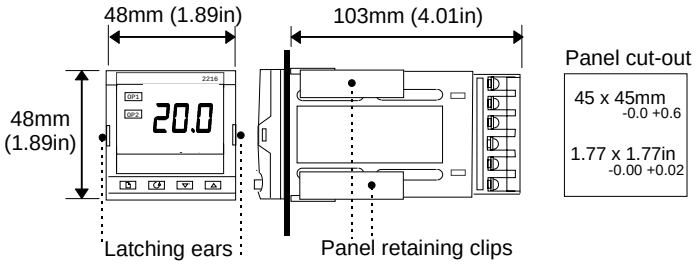
The indicator is supplied configured according to the ordering code given on page 5. Check the coding on the side labels to determine the configuration of your particular indicator.

## DIMENSIONS AND INSTALLATION

### Model 2132*i*




### Model 2116*i*



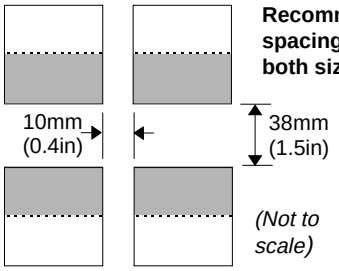

### To install the indicator

Please read the safety information on pages 5 & 6 before proceeding.

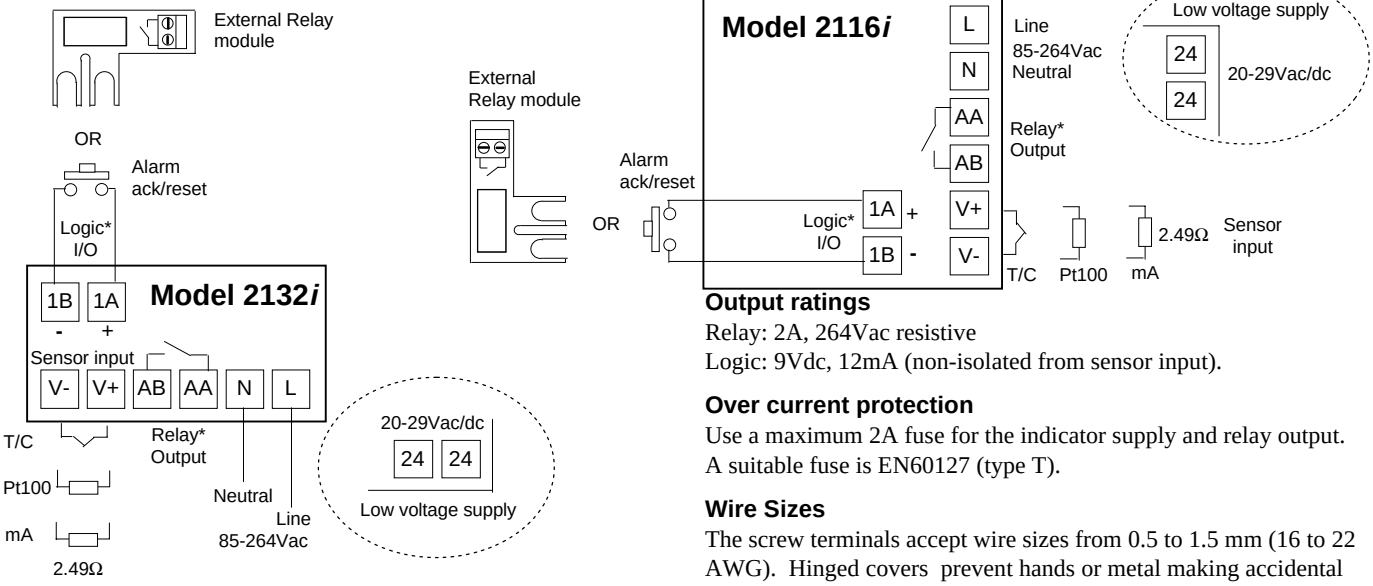
1. Prepare the panel cut-out to the size shown.
2. Insert the indicator through the cut-out.
3. Spring the panel retaining clips into place. Secure the indicator in position by holding it level and pushing both retaining clips forward.
4. Peel off the protective cover from the display

### Unplugging the indicator

The indicator can be unplugged from its sleeve by easing the latching ears outwards and pulling it forward out of the sleeve. When plugging the indicator back into its sleeve, ensure that the latching ears click into place to maintain the IP65 sealing.




## ELECTRICAL CONNECTIONS




*Not fitted in indicator only units. Also terminals 1A and 1B not fitted in indicator only unit.

### Output ratings

Relay: 2A, 264Vac resistive
Logic: 9Vdc, 12mA (non-isolated from sensor input).

### Over current protection

Use a maximum 2A fuse for the indicator supply and relay output. A suitable fuse is EN60127 (type T).

### Wire Sizes

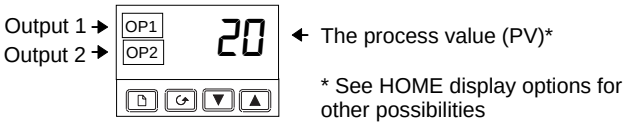
The screw terminals accept wire sizes from 0.5 to 1.5 mm (16 to 22 AWG). Hinged covers prevent hands or metal making accidental contact with live wires. The rear terminals screws should be tightened to 0.4Nm (3.5lb in).

CE This indicator meets the European directives on safety and EMC

ENG

## OPERATION

Switch on the indicator. Following a 3 second self-test sequence, you will see the display shown below. It is called the HOME display.




## ALARM INDICATION

The indicator has three internal 'soft' alarm setpoints which can be attached to either the logic or relay outputs.

OP1 will flash when an alarm attached to the logic output becomes true. (This is normally alarm 1). It will go steady when the alarm is acknowledged but still true.

OP2 will flash when an alarm attached to the relay output becomes true. (This is normally alarm 2 or 3). It will go steady when the alarm is acknowledged but still true.

### TO ACKNOWLEDGE A NEW ALARM

Press and together. This will also reset any latched alarms that are no longer true.

In addition to the OP beacons, alarm messages are flashed in the main display. The tables below list all of the possible messages and their meaning.

## ALARM MESSAGES

| Process Alarms | |
|---|---|
| **Message** | **Meaning** |
| 1FSL | Alarm 1 is active and it is a Low alarm. |
| 1FSH | Alarm 1 is active and it is a High alarm. |
| 2FSL | Alarm 2 is active and it is a Low alarm. |
| 2FSH | Alarm 2 is active and it is a High alarm. |
| 3FSL | Alarm 3 is active and it is a Low alarm. |
| S.br | *Sensor Break:* Input sensor is open circuit or high resistance. Check the sensor. |

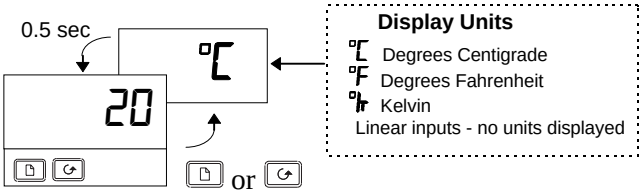
In addition to the above messages, the displayed process value will flash if the input signal or the displayed value is out of range.

The table above shows normal process alarms. In the event of a failure in the indicator or the sensor the following diagnostic alarm messages are provided.

| Diagnostic alarms | |
|---|---|
| **Message** | **Meaning and (Action)** |
| EE.Er | *Electrically Erasable Memory Error:* A parameter value has been corrupted. Contact Eurotherm Controls. |
| Hw.Er | *Hardware error.* ( Return for repair) |
| LLLL | *Low display range exceeded*: (Check input signal) |
| HHHH | *High display range exceeded:* (Check input signal) |
| Err 1 | *Error 1: ROM self-test fail.* (Return for repair) |
| Err2 | *Error 2: RAM self-test fail.* (Return for repair) |
| Err3 | *Error 3: Watchdog fail.* (Return for repair) |
| Err4 | *Error 4: Keyboard failure.* Stuck button, or a button was pressed during power up. |
| Err5 | *Error 5: Input circuit failure.* (Return for repair) |
| Pwr.F | *Power failure.* The line voltage is too low. |

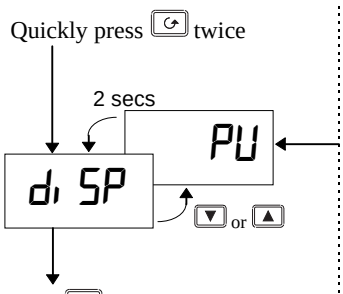
## TO VIEW THE DISPLAY UNITS

Press and release quickly the or button. The display units will be flashed for 0.5sec




If you get lost, pressing and together will return you to the HOME display.
If, at any time, no key is pressed within 45 seconds, the display will always return to the HOME display.

## HOME DISPLAY OPTIONS



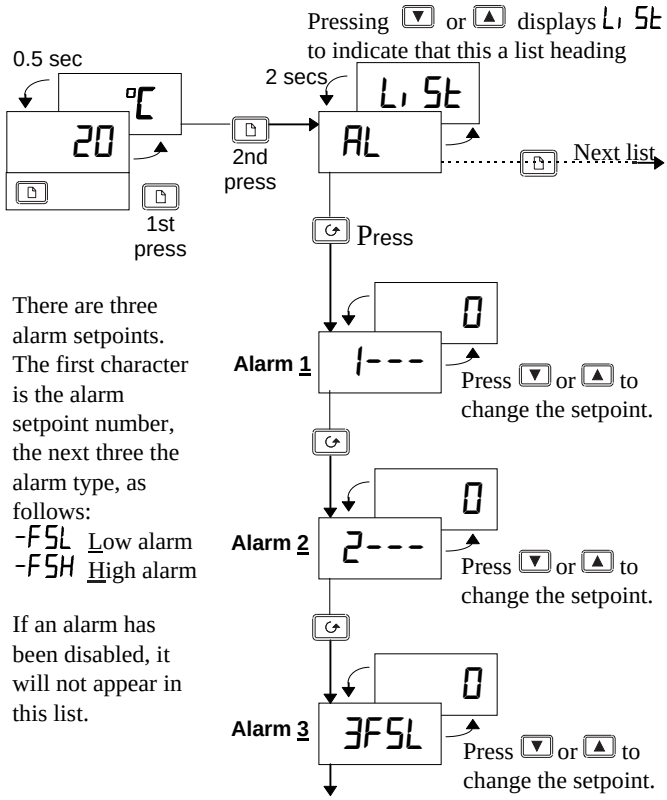

To prevent an Operator changing this option, see "To Hide Parameters" .

Press or to select:

| | |
|---|---|
| Std | Not used by indicator |
| OP | Not used by indicator. (Only applies to software version 1.4) |
| nonE | The HOME display will be blank and only alarm messages will be flashed |
| PU | The Process value will be displayed |
| AL.SP | Alarm 2 setpoint will be displayed and can be adjusted by or |
| PU.AL | The Process value will be displayed with Alarm 2 setpoint viewed and adjusted by or |

## TO CHANGE THE ALARM SETPOINTS (TRIP LEVELS)

The button steps through parameter list headings. The first list is the alarm setpoints. The other lists are shown on the next page.

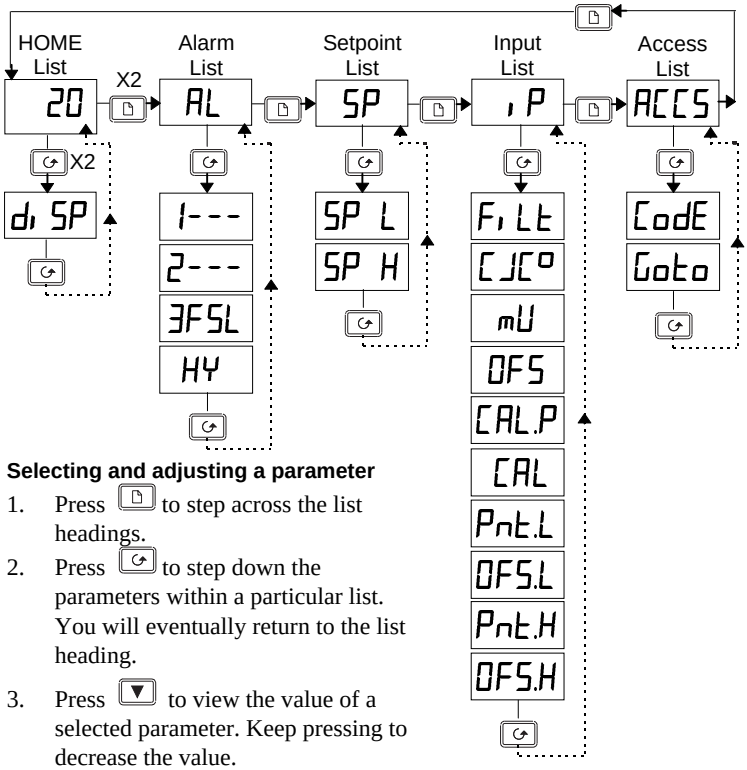



There are three alarm setpoints. The first character is the alarm setpoint number, the next three the alarm type, as follows:
-FSL Low alarm
-FSH High alarm

If an alarm has been disabled, it will not appear in this list.

## PARAMETER LISTS

Use these lists to change: • The alarm setpoints •The alarm setpoint limits •User calibration.




**Selecting and adjusting a parameter**

1. Press ▢ to step across the list headings.
2. Press ↻ to step down the parameters within a particular list. You will eventually return to the list heading.
3. Press ▼ to view the value of a selected parameter. Keep pressing to decrease the value.
4. Press ▲ to view the value of a selected parameter. Keep pressing to increase the value.

**Parameter tables**

| HOME | **Home List** | Selectable options | Default setting |
|---|---|---|---|
| diSP | HOME display options | See HOME display options on page 2 | PV |

| AL | **Alarm setpoints** | Adjustable Range | Default setting |
|---|---|---|---|
| *1--- | Alarm 1 setpoint | Between low | 0 |
| *2--- | Alarm 2 setpoint | and high | 0 |
| 3FSL | Alarm 3 setpoint | setpoint limits | 0 |
| HY | Alarm Hysterisis | 1-9999 PV units | 1 |

*In place of dashes, the last three letters indicate the alarm type: FSL = Low alarm. FSH=High alarm

| SP | **Setpoint limits** | Adjustable Range | Default setting |
|---|---|---|---|
| SP L | Setpoint low limit | Between Process | As per order |
| SP H | Setpoint high limit | Value min & max | code |

| iP | **Input List** | Adjustable Range | Default setting |
|---|---|---|---|
| FiLt | Input filter time in secs | OFF-999.9 | 1.6 |
| OFS | Process value offset | 0-9999 units | 0 |
| CJC° | Cold junction temperature at the rear term'ls | | Read-only |
| mV | mV input at the rear terminals | | Read-only |
| CAL.P | Calibration password | 0-9999 | 3 |
| CAL | Calibration type. | FACt (Factory) USEr (User) | FACt |
| Pnt.L | Low calibration point | See User Calibration | 0 |
| OFS.L | Low point offset | | 0 |
| Pnt.H | High calibration point | | 100 |
| OFS.H | High point offset | | 0 |

| ACCS | **Access list** | Used for re-configuring the indicator. |
|---|---|---|

## TO HIDE PARAMETERS OR MAKE THEM READ-ONLY

ACCS Press ▢ to reach the Access List Heading.

Press ↻

PASS / CodE — Press ▼ or ▲ to enter the password. The factory default is 1. PASS will be displayed when the correct password has been entered.

Press ↻

Edit / Goto — Use ▼ or ▲ to select Edit level. Other options are:

- OPEr For Operator level
- FuLL Shows the 'Full' set of available parameters
- ConF Gives access to configuration level.

Press ↻ to return to the Access list header.

ACCS You are now in Edit level. Press ▢ and ↻ to select a parameter in the normal way.

HidE / 2FSH — **Example:** High alarm 2 has been selected. When ▼ or ▲ is pressed, instead of displaying the parameter value, its availability to Operator is shown as follows:

- ALtr The parameter will be alterable
- Pro The parameter will be 'promoted' into the HOME list
- rEAd The parameter will be read-only
- Hi dE The parameter will be hidden.

Repeat for all the parameters you wish to hide or make read-only then return to operator level:

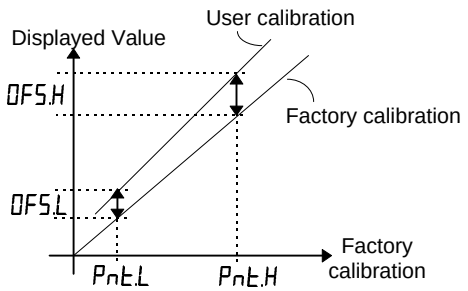
OPEr / Goto

Press ▢ until you reach the ACCS list heading
Press ↻ until you reach Goto
Press ▼ or ▲ to select OPEr
Press ▢ to return to Operator level

## USER CALIBRATION

Your indicator has been calibrated for life against known reference sources in the factory. User calibration allows you to apply offsets to compensate for sensor and other system errors. The parameter OFS in the iP list applies a fixed offset over the whole display range. You may also apply a 2-point calibration as follows:

- Press ▢ until you reach the iP list
- Press ↻ until you reach the CAL.P parameter
- Press ▼ or ▲ to enter the password. The factory default is 3. PASS will be displayed when correct.
- Press ↻ to reach the CAL parameter
- Press ▼ or ▲ to select USEr (FACt will restore the factory calibration)
- Apply 2-point calibration as below:



## CONFIGURING THE INDICATOR

Select configuration level to change: •The display units •The input sensor type •The scaling of linear inputs •The alarm configuration • The passwords.

### To select configuration level

ACCS Press to reach the Access List Heading.

Press

CodE PASS Use or to enter the password. The factory default is 1. PASS will be displayed when the correct password has been entered.

Press

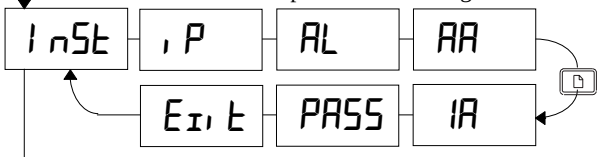
Goto conF Use or to select conF

Press

ConF PASS Use or to enter the configuration level password. The factory default is 2. PASS will be displayed when the correct password has been entered.

Press to enter configuration level.

→ Press to step across the configuration list headings.

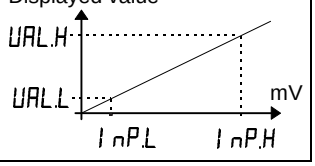



Having selected a list heading, press to select a parameter within a particular list. Press and to change the setting.

| InSt | Instrument list | Options | Meaning |
|---|---|---|---|
| unit | Display units | °C<br>°F<br>°K<br>none | Centigrade<br>Fahrenheit<br>Kelvin<br>None (for linear inputs) |
| dEC.P | Decimal places in display | nnnn<br>nnn.n<br>nn.nn | None<br>One<br>Two |
| CtrL | Control type | AL | Always set to AL |
| | Selecting On.OF or Pid will convert the indicator into a controller which requires separate instructions. | | |
| The parameters that follow, (Act, Pd.tr and PwrF), are not used by the indicator and require separate instructions. | | | |

| iP | Sensor Input | Options | Meaning |
|---|---|---|---|
| inPt | Input type | J.tc<br>K.tc<br>L.tc<br>r.tc<br>b.tc<br>n.tc<br>t.tc<br>S.tc<br>PL 2<br>rtd<br>C.tc<br>mV | J thermocouple<br>K thermocouple<br>L thermocouple<br>R thermocouple<br>B thermocouple<br>N thermocouple<br>T thermocouple<br>S thermocouple<br>Platinell II<br>100Ω Pt thermometer<br>Custom input- C=st'd<br>Linear mV |
| CJC | Cold junction compensation | OFF<br>Auto | OFF - Linear inputs only<br>Automatic |
| | | 0°C, 45°C or 50°C | external ref. |
| Imp | Sensor break input impedance | Auto = 1.5KΩ, Hi =5KΩ,<br>Hi Hi = 15KΩ | |

Continued in next column....

| Linear input scaling (-12.00 to +80.00mV) | | |
|---|---|---|
| InPL | mV input low | Displayed value<br>  <br> |
| InPH | mV input high | |
| UAL.L | Displayed value low | |
| UAL.H | Displayed value high | |

### Alarm Configuration

The AL list configures the three internal 'soft' alarms and causes the appropriate alarm message to be flashed in the HOME display.

| AL | Alarm list | Options | Meaning |
|---|---|---|---|
| AL 1 | Alarm 1 | OFF<br>FSL<br>FSH | The alarm is disabled<br>Low alarm<br>High alarm |
| | *Not used in the indicator* | dEu<br>dHi<br>dLo | Deviation band alarm<br>Deviation high alarm<br>Deviation low alarm |
| Ltch | Alarm latching | no<br>YES<br>mAn | Non-latching<br>Special - Not used<br>Latched (manual reset) |
| bLoc | Alarm blocking | no<br>YES | No blocking<br>Blocked until first good |
| The above sequence is repeated for AL 2 & AL 3 (Alarms 2 & 3) | | | |
| SP.Li | Alarm setpoint limits | di S<br>Con | Limited by display range<br>Limited by setpoint limits |

### Relay and Logic input/output Configuration

The AA and IA lists attach the three internal alarms to the relay and logic outputs. The logic can be configured as an alarm output or as an alarm acknowledge input.

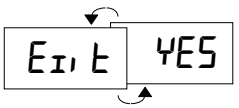
| AA | Relay output | Options | Meaning |
|---|---|---|---|
| IA | **Logic output** | | |
| id | Identity of output | rELY<br>LoG | Relay<br>Logic |
| Func | Function<br>*Logic only* | di G<br>Ac.AL | Digital output<br>Alarm Ack input |
| | Functions: HEAt, COOL, SSr.I and rrES are not used by the indicator and require separate instructions | | |
| di G.F | Digital output functions<br>Any combination of alarms can be attached to the logic or relay output. Press and to select a desired alarms<br>After a two second pause the display blinks and returns to di G.F. Pressing and again will show two decimal points in those alarms that have been added to the output | noch<br>CLr<br>1F.S.L<br>2F.S.H<br>3F.S.L<br>S.b.r<br>nw | No change<br>Clear all alarms<br>Alarm 1*<br>Alarm 2*<br>Alarm 3*<br>Sensor break<br>New alarm |
| | Functions: Lbr, LdF, mAn, End, & tmG I, to tmG4 are not used by the indicator and need separate instructions | | |
| SEnS | Sense of the output.<br>inu = output de-energised in alarm. | nor<br>Inu | Normal<br>Inverted |

*The last three letters will correspond to the alarm type set in the AL list. If the alarm is disabled, AL 1 or AL 2 or AL 3 will be shown.

### Passwords

| PASS | Passwords | Range | Default |
|---|---|---|---|
| ACC.P | Full and Edit level password | 0-9999 | 1 |
| CnF.P | Configuration level password | 0-9999 | 2 |
| CAL.P | User calibration password | 0-9999 | 3 |

### To leave Configuration level




Press to reach the EXIt display
Press or to select YES After 2 secs the display will blink and return to the HOME display in Operator level.

## ORDERING CODE

The indicator is supplied configured according to the ordering code shown below.

| Model number | Function | Supply voltage | Manual | Logic I/O | Alarm Relay Output | Sensor input | Setpoint min | Setpoint max | Units | External relay module | Input adaptor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2132*i*<br>2116*i* | | | | | | | | | | | |

| Function | |
|---|---|
| ND | Indicator only* |
| AL | Indicating alarm unit |

| Supply voltage | |
|---|---|
| VH | 85-264Vac |
| VL | 20 -29V dc or ac |

| Manual | |
|---|---|
| XXX | None |
| ENG | English |
| FRA | French |
| GER | German |
| NED | Dutch |
| SPA | Spanish |
| SWE | Swedish |
| ITA | Italian |

| Logic I/O | |
|---|---|
| XX | Disabled* |
| **Logic input** | |
| AC | Alarm ack/reset |
| KL | Keylock |
| **Non-latched alarms** | |
| FH | High alarm 1 |
| FL | Low alarm 1 |
| **Latched alarms** | |
| HA | High alarm 1 |
| LA | Low alarm 1 |
| NW | New alarm |

| Alarm Relay Output | |
|---|---|
| XX | Disabled* |
| **Non-latched alarms** | |
| FH | High alarm 2 |
| FL | Low alarm 2 |
| AL | High alarm 2 & low alarm 3 |
| **Latched alarms** | |
| HA | High alarm 2 |
| LA | Low alarm 2 |
| AA | High alarm 2 & low alarm 3 |
| NW | New alarm |

| Sensor input | | Display range and Setpoint min & max limits °C | ° F |
|---|---|---|---|
| **Thermocouples** | | | |
| J | Type J | -210 to 1200 | -340 to 2192 |
| K | Type K | -200 to 1372 | -325 to 2500 |
| T | Type T | -200 to 400 | -325 to 750 |
| L | Type L | -200 to 900 | -325 to 1650 |
| N | Type N | -200 to 1300 | -325 to 2370 |
| R | Type R | -50 to 1768 | -58 to 3200 |
| S | Type S | -50 to 1768 | -58 to 3200 |
| B | Type B | 0 to 1820 | 32 to 3308 |
| P | Platinell II | 0 to 1369 | 32 to 2496 |
| **Resistance thermometer** | | | |
| Z | Pt100 | -200 to 850 | -325 to 1562 |
| **Custom downloaded inputs** | | | |
| C | Type C -W5%Re/W26%Re (default custom sensor) | 0 to 2319 | 32 to 4200 |
| D | Type D - W3%Re/W25%Re | 0 to 2399 | 32 to 4350 |
| E | E thermocouple | -200 to 999 | -325 to 1830 |
| 1 | Ni/Ni18%Mo | 0 to 1399 | 32 to 2550 |
| 2 | Pt20%Rh/Pt40%Rh | 0 to 1870 | 32 to 3398 |
| 3 | W/W26%Re (Engelhard) | 0 to 2000 | 32 to 3632 |
| 4 | W/W26%Re (Hoskins) | 0 to 2010 | 32 to 3650 |
| 5 | W5%Re/W26%Re (Engelhard) | 10 to 2300 | 50 to 4172 |
| 6 | W5%Re/W26%Re(Bucose) | 0 to 2000 | 32 to 3632 |
| 7 | Pt10%Rh/Pt40%/Rh | 200 to 1800 | 392 to 3272 |
| 8 | Exergen K80 I.R. Pyrometer | -45 to 650 | -49 to 1202 |
| **Process inputs (linear)** | | | |
| M | -9.99 to +80mV | Scalable -999 to 9999 | |
| Y | 0 to 20mA | Scalable -999 to 9999 | |
| A | 4 to 20mA | Scalable -999 to 9999 | |
| V | 0 to 10Vdc (*input adapter required)* | Scalable -999 to 9999 | |

| Input Adaptor | |
|---|---|
| XX | None |
| V1 | 0-10Vdc |
| A1 | 0-20mA sense resistor (2.49Ω. 0.1%) |

| External relay module | |
|---|---|
| XX | Not fitted |
| R7 | Fitted (Operated by the logic output) |

| Units | |
|---|---|
| C | °C |
| F | ° F |
| K | Kelvin |
| X | Linear input |

*If 'ND' (Indicator only) is specified in the function field, then XX must be entered in the Logic I/O and alarm 2 relay fields.

## TECHNICAL SPECIFICATION

| | |
|---|---|
| Display | 4 digit, green. 10mm high characters |
| Supply voltage | High voltage unit: 100Vac -15% to 240Vac +10%, 48-62Hz. Power consumption: 5Watts maximum<br>Low voltage unit: 24Vdc or ac -15%, +20% DC to 62Hz, Power consumption: 5Watts maximum |
| Operating ambients | 0 to 55°C. 5 to 95%RH, non condensing |
| Storage temperature | -30°C to +75°C. |
| Output ratings | Relay(isolated): Maximum: 264Vac, 2A resistive. Minimum: 12Vdc, 100mA<br>Logic I/O: 9Vdc at 18mA (non-isolated from sensor input). Can be used as alarm output or alarm acknowledge input |
| Calibration accuracy | ± 1°C or ±0.25% of reading whichever is greater |
| Cold junction compensation | >30 to 1 rejection of ambient temperature change. Uses INSTANT ACCURACY™ cold junction sensing technology to eliminate warm-up drift and respond rapidly to ambient temperature changes. |
| Input filtering | Off to 999.9 seconds |
| EMC standards | Generic emissions standard EN50081-2 and immunity standard EN50082-2 for industrial environments |
| Safety standard | EN 61010. Installation category II. (Voltage transients on the power supply must not exceed 2.5kV). Pollution degree 2. All isolated inputs and outputs have reinforced insulation to protect against electric shock. |
| Atmosphere | Not suitable for use above 2000m or in explosive or corrosive atmospheres |
| Panel sealing | IP65 (EN 60529), or NEMA 4X |

## SAFETY AND EMC INFORMATION

### Safety

This indicator complies with the European Low Voltage Directive 73/23/EEC, amended by 93/68/EEC, by the application of the safety standard EN 61010.

### Electromagnetic compatibility

This indicator conforms with the essential protection requirements of the EMC Directive 89/336/EEC, amended by 93/68/EEC, by the application of a Technical Construction File. This indicator satisfies the general requirements of the industrial environment defined in EN 50081-2 and EN 50082-2.

## GENERAL

The information contained in these instructions is subject to change without notice. While every effort has been made to ensure the accuracy of the information, Eurotherm Controls shall not be held liable for errors contained herein.

### Unpacking and storage

The packaging should contain the indicator, two panel retaining clips, a 2.49Ω current sense resistor and this instruction leaflet. If the packaging or the indicator are damaged, do not install the product but contact your nearest Eurotherm Controls agent.

Continued on the next page

## SERVICE AND REPAIR

This indicator has no user serviceable parts. Contact your nearest Eurotherm Controls agent for repair.

### *Caution:* Charged capacitors

Before removing the indicator from its sleeve, switch off the supply and wait two minutes to allow capacitors to discharge. Failure to observe this precaution may damage the indicator or cause some discomfort to the user.

### Electrostatic discharge precautions

When the indicator is removed from its sleeve, it is vulnerable to damage by electrostatic discharge from someone handling the indicator. To avoid this, before handling the unplugged indicator discharge yourself to ground.

### Cleaning

Do not use water or water based products to clean labels or they will become illegible. Isopropyl alcohol may be used to clean labels. A mild soap solution may be used to clean other exterior surfaces of the product.

### Safety Symbols

The following safety symbols are used on the controller:

Caution. Refer to the accompanying documents

### Personnel

Installation must be carried out by qualified personnel.

### Enclosure of live parts

The indicator must be installed in an enclosure to prevent hands or metal tools touching parts that may be electrically live.

### *Caution:* Live sensors

The logic input/output is electrically connected to the sensor input (e.g. thermocouple). In some installations the temperature sensor may become live. The indicator is designed to operate under these conditions, but you must ensure that this will not damage other equipment connected to the logic input/output and that service personnel do not touch this connection while it is live. With a live sensor, all cables, connectors and switches for connecting the sensor and non-isolated inputs and outputs must be mains rated.

### Wiring

Wire the indicator in accordance with the wiring data given in these instructions. Take particular care not to connect AC supplies to the low voltage sensor input or logic outputs. Only use copper conductors for connections, (except thermocouple). Use a minimum of $0.5mm^2$ or 16swg wire for plant connections. Ensure that the installation complies with local wiring regulations.

### Power Isolation

The installation must include a power isolating switch or circuit breaker that disconnects all current carrying conductors. The device should be mounted in close proximity to the indicator, within easy reach of the operator and marked as the disconnecting device for the indicator.

### Voltage rating

The maximum continuous voltage applied between any connection and ground must not exceed 264Vac.

For the above reason the indicator should not be wired to a three phase supply with an unearthed star connection. Under fault conditions such a supply could rise above 264Vac with respect to ground and the product would not be safe.

### Conductive pollution

Electrically conductive pollution (for example carbon dust) must be excluded from the cabinet in which the indicator is mounted. Where condensation is likely, for example at low temperatures, include a thermostatically controlled heater in the cabinet.

### Installation requirements for EMC

- For general guidance refer to Eurotherm Controls EMC Installation Guide, HA025464.
- It may be necessary to fit a filter across the relay output to suppress conducted emissions. The filter requirements will depend on the type of load. For typical applications we recommend Schaffner FN321 or FN612.

### Routing of wires

To minimise the pick-up of electrical noise, the sensor input wiring should be routed away from high-current power cables. Where it is impractical to do this, use shielded cables with the shield grounded at both ends.

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